

CLAIMS

We claim:

- 1.) A method of measuring the concentration of an analyte in a gas sample of exhaled breath, comprising:
 - providing a first disposable sensor, said first sensor comprising a sensing element, wherein said sensing element undergoes a change in the presence of said analyte;
 - loading said first sensor into a gas analysis device;
 - measuring the concentration of said analyte in an exhaled breath sample using said first disposable sensor and said gas analysis device;
 - removing said first sensor from said device; and
 - installing a second disposable sensor into said device.
- 2.) The method according to claim 1, wherein said disposable sensor is within a disposable housing.
- 3.) The method according to claim 1, wherein said change is a change in an optically quantifiable characteristic.
- 4.) The method according to claim 1, wherein said analyte is nitric oxide.
- 5.) The method according to claim 4, wherein said sensing element comprises a sol-gel.
- 6.) The method according to claim 5, wherein said sensing element additionally comprises cytochrome-c.
- 7.) The method according to claim 1, wherein the step of measuring the concentration of an analyte in a gas sample using said disposable sensor and said gas analysis device comprises employing means for ensuring that extraneous signals do not interfere with measurement.

- 8.) The method according to claim 7, wherein said means for ensuring that extraneous signals do not interfere with measurement comprises two separate channels for analysis of the gas, wherein one of said channels is used for reference analysis.
- 9.) The method according to claim 7, wherein said means for ensuring that extraneous signals do not interfere with measurement comprises using two separate sensing elements for analysis of the gas, wherein one of said elements is used for reference analysis.
- 10.) The method according to claim 1, additionally comprising conditioning the gas sample before measurement.
- 11.) The method according to claim 1, wherein said first disposable sensor uses calibration information associated with said sensor.
- 12.) A disposable sensor for use with a device that quantifies the concentration of an analyte in a gaseous sample of exhaled breath, comprising:
 - a disposable sensing element, wherein said disposable sensing element is responsive to the analyte; and
 - means for installing said disposable sensor into said device.
- 13.) The sensor according to claim 12, additionally comprising a disposable housing surrounding said disposable sensing element.
- 14.) The sensor according to claim 12, wherein said sensing element is optically responsive to the analyte.
- 15.) The sensor according to claim 12, wherein said analyte is nitric oxide.
- 16.) The sensor according to claim 15, wherein said sensing element comprises a sol-gel.

- 17.) The sensor according to claim 16, wherein said sensing element additionally comprises cytochrome-c.
- 18.) A disposable sensor for use with a device that quantifies the concentration of an analyte in a gaseous sample of exhaled breath, comprising:
 - a sensing element; and
 - an interface means for interfacing said sensor with said device.
- 19.) The sensor according to claim 18, wherein said interface means comprises a means to align an optical window in said sensor with an appropriate location or locations on said device.
- 20.) The sensor according to claim 18, wherein said interface means comprises a means to align electrical contacts associated with said sensor with an appropriate location or locations on said device.
- 21.) The sensor according to claim 18, wherein said interface means comprises a slot in said device and a guide in said sensor.
- 22.) A kit for analyzing the concentration of an analyte in a sample of exhaled breath, comprising:
 - a plurality of disposable sensors, wherein said sensors include a disposable sensing element responsive to said analyte;
 - a gas analysis device for use with said sensors, comprising means for measuring the concentration of said analyte in said exhaled breath.
- 23.) The kit according to claim 22, wherein said sensor additionally comprises a disposable housing surrounding said disposable sensing element.
- 24.) The kit according to claim 22, wherein said sensing element is optically responsive to the analyte.

- 25.) The kit according to claim 22, wherein said analyte is nitric oxide.
- 26.) The kit according to claim 25, wherein said sensing element comprises a sol-gel.
- 27.) The kit according to claim 26, wherein said sensing element additionally comprises cytochrome-c.
- 28.) A sensor for use with a device that quantifies the concentration of an analyte in a gaseous sample of exhaled breath, comprising:
 - a sensing element; and
 - a use limitation means.
- 29.) The sensor according to claim 28, wherein said use limitations means comprises a means for preventing or discouraging use of the sensor after it has been used a certain number of times.
- 30.) The sensor according to claim 29, wherein said certain number of times is thirty.
- 31.) The sensor according to claim 29, wherein said certain number of times is one.
- 32.) The sensor according to claim 28, wherein said use limitations means comprises a means for preventing or discouraging use of the sensor after an expiration date.
- 33.) The sensor according to claim 28 or 32, wherein said use limitations means comprises an information storage device.
- 34.) The sensor according to claim 33, wherein said information storage device comprises an integrated circuit.

- 35.) The sensor according to claim 33, wherein said information storage device comprises a magnetic strip.
- 36.) The sensor according to claim 28, wherein said use limitation means comprises a means for preventing or discouraging use of the sensor after it has once been removed from a gas analysis device.
- 37.) The sensor according to claim 36, wherein said use limitations means comprises a tab.
- 38.) The sensor according to claim 36, wherein said use limitations means comprises a fuse.
- 39.) The sensor according to claim 36, wherein said use limitations means comprises a means for detecting a leak within said sensor.
- 40.) A disposable sensor for quantifying the concentration of an analyte in a gaseous sample of exhaled breath, comprising:
 - a housing;
 - a disposable sensing element within said housing; and
 - a port in said housing for entry of said gaseous sample of exhaled breath; and
 - means for sealing said port until it is time for the sensor to receive the gas sample of exhaled breath.
- 41.) The sensor according to claim 40, wherein said means for sealing said port is a puncturable cover.
- 42.) The sensor according to claim 40, additionally comprising:
 - a second port in said housing for exit of said gaseous sample of exhaled breath; and

means for sealing said second port until it is time for the sensor to receive a gas sample of exhaled breath.

43.) The sensor according to claim 42, wherein said means for sealing said second port is a second puncturable cover.

44.) A sensor for use with a device that quantifies the concentration of an analyte in a gaseous sample of exhaled breath, comprising:

 a housing;
 a disposable first sensing element within said housing; and
 means for accounting for the effect of interfering signals that might otherwise impede accurate calculation of said concentration.

45.) The sensor according to claim 44, wherein said means for accounting for the effect of interfering signals comprises two gas cells within said housing.

46.) The sensor according to claim 44 or 45, wherein said means for accounting for the effect of interfering signals comprises a second sensing element within said housing.

47.) A sensor for use with a device that quantifies the concentration of an analyte in a gaseous sample of exhaled breath, comprising:

 a housing;
 a disposable sensing element within said housing; and
 a first sample conditioning unit within said housing.

48.) The sensor according to claim 47, wherein said sample conditioning unit comprises zeolite (5A or 13x), a silica gel, or another desiccant.

49.) The sensor according to claim 47, wherein said sample conditioning comprises potassium permanganate combined with charcoal or zeolite3A.

- 50.) The sensor according to claim 47, additionally comprising a second sample conditioning unit, wherein said first sample conditioning unit is for use in measuring a first analyte, and said second sample conditioning unit is for use in measuring a second analyte.
- 51.) A sensor for use with a device that quantifies the concentration of an analyte in a gaseous sample of exhaled breath, comprising:
 - a housing;
 - a disposable sensing element within said housing; and
 - a means for limiting the rate of diffusion of said sample.
- 52.) The sensor according to claim 51, wherein said means for limiting the rate of diffusion comprises a diffusion port.
- 53.) A disposable sensor for use with a device that quantifies the concentration of an analyte in a gaseous sample of exhaled breath, comprising:
 - a disposable sensing element; and
 - calibration information associated with said sensing element.
- 54.) The sensor according to claim 53, wherein said calibration information comprises text for reading by a user.
- 55.) The sensor according to claim 54, wherein said text comprises a code.
- 56.) The sensor according to claim 54, wherein said text comprises a coefficient table.
- 57.) The disposable sensor according to claim 53, wherein said calibration information is stored in an integrated circuit associated with said sensing element.

- 58.) The disposable sensor according to claim 53, wherein said calibration information is stored in a bar code associated with said sensing element.
- 59.) The disposable sensor according to claim 53, wherein said calibration information is stored in an optical code associated with said sensing element.
- 60.) A package of disposable sensors, comprising:
 - a plurality of disposable sensors for use in analyzing exhaled breath; and
 - a storage compound placed near said sensors.
- 61.) The package according to claim 60, wherein said storage compound comprises a desiccant.
- 62.) The package according to claim 60, wherein said storage compound comprises a salt solution.
- 63.) A system for analysis of a gaseous sample, comprising:
 - a device for the analysis of exhaled breath;
 - a plurality of disposable sensors, said sensors installable in said device.
- 64.) A sensor for use with a device that quantifies the concentration of an analyte in a gaseous sample of exhaled breath, comprising:
 - a housing with a transparent window;
 - a disposable sensing element within said housing; and
 - means for protecting said window from smudges or other optical interferences.
- 65.) The sensor according to claim 64, wherein said means for protecting said window comprises placing said window in a recess in said housing.

66.) The sensor according to claim 64, wherein said means for protecting said window comprises a protective covering over said window.